

ABSTRACT

A process and the required apparatus for air conditioning the interior of a structure located within a harsh desert like exterior environment. The air conditioning system is particularly effective at times when the exterior temperature is in excess of approximately 90 to 95 degrees Fahrenheit, and the exterior relative humidity is less than approximately 35 to 40 percent. A tube and shell heat exchanger wherein the shell side is wet and the tube side is dry is employed to air condition the interior of the structure. In the operation of the air conditioner, a mass of distributed water, for example, a spray, is established on the wet shell side, and a flow of ambient air is passed through the wet shell side to form a resulting stream of moist air. A flow of ambient air is passed through the dry tube side and a resulting stream of dry cooled air is recovered. The streams of moist and cooled air are combined and the resulting stream of combined air is discharged into the exterior of the structure. The structure is not hermetically sealed so there is little or no pressure difference between the interior of the structure and the surrounding environment. The system requires so little power that it can be operated on a battery system charged from an ambient energy source harvested by, for example, a small wind turbine or an array of conventional 30 volt 4 amp hour solar power cells. The water consumption rate is generally less than approximately 10 percent that of a conventional evaporative cooler. The humidity in the interior of the structure is generally no more than approximately 2 to 2.3 times that of the exterior environment.